

# USING VIRTUAL MACHINES TO SIMILATE "UEFI" WITH "SECURE BOOT"

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# SUMMARY

Using the "Hyper-V" applet inside "Windows 8", "Windows 8.1", "Windows Technical Preview", and "Windows Technical Preview for Enterprise", you can create virtual machines have a "UEFI" with "Secure Boot" and run "Windows 8..", "Windows 8.1", "Windows 10", and "Linux" as "guest" operating systems.

# TOPICS

- "BIOS" Replaced by "UEFI" with "Secure Boot"
- "Virtual Machine Programs" That Provide "Virtual Machines" With "UEFI" with "Secure Boot"

# TOPICS (continued)

- Running "Windows.." in a Virtual Machine That Has "Secure Boot" Enabled
- Running "Linux" in a Virtual Machine That Has "Secure Boot" Enabled

# TOPICS (continued)

- Creating a Virtual Machine in Hyper-V

# TOPICS (continued)

- Testing whether a "Windows.." computer is running in legacy BIOS mode or UEFI mode
- Testing whether a "Linux" computer is running in legacy BIOS mode or UEFI mode

# TOPICS (continued)

- Testing whether a "Windows.." computer is running with "Secure Boot" enabled
- Testing whether a "Linux" computer is running with "Secure Boot" enabled



# "BIOS" REPLACED BY "UEFI" WITH "SECURE BOOT"

- Since August of 2012, Microsoft's "Windows Hardware Certification Program" requires that all "Windows 8" and "Windows 8.1" computers must have an UEFI with "Secure Boot" enabled.

# "BIOS" REPLACED BY "UEFI" WITH "SECURE BOOT" (continued)

Microsoft's "Windows 8.1 Hardware Certification Policy" states that

"Windows 8 and later certification requires that systems implement UEFI native boot as the firmware boot mode and Secure Boot as the default out-of-box configuration".

# "BIOS" REPLACED BY "UEFI" WITH "SECURE BOOT" (continued)

- Reference:

"Windows 8.1 Hardware  
Certification Policy" at

<http://msdn.microsoft.com/library/windows/hardware/dn423132.aspx>

# "BIOS" REPLACED BY "UEFI" WITH "SECURE BOOT" (continued)

- "UEFI" stands for "Unified Extensible Firmware Interface". (See [http://en.wikipedia.org/wiki/Unified\\_Extensible\\_Firmware\\_Interface](http://en.wikipedia.org/wiki/Unified_Extensible_Firmware_Interface))

# "BIOS" REPLACED BY "UEFI" WITH "SECURE BOOT" (continued)

- This means that all "Windows 8", all "Windows 8.1", and all future "Windows 10" computers that are sold at retail AND display the "Windows 8" logo, or the "Windows 8.1" logo, or the future "Windows 10" logo, must boot up with a "UEFI with Secure Boot enabled instead of the legacy "Basic input/Output System" ("BIOS").

# **"VIRTUAL MACHINE PROGRAMS" THAT PROVIDE "VIRTUAL MACHINES" WITH "SECURE BOOT"**

- In order to accurately and rigorously use a virtual machine to simulate a current desktop or laptop "Windows.." or "Linux.." computer, you have to use a virtual machine program that provides a virtual machine with a virtual "UEFI" with a virtual "Secure Boot" module.

**RUNNING "WINDOWS.."  
IN A "VIRTUAL  
MACHINE" WITH  
"SECURE BOOT"**

If you have real, host computer that is running

"Windows 8 Pro" or

"Windows 8 Enterprise" or

"Windows 8.1 Pro" or

"Windows 8.1 Enterprise" or

"Windows Technical Preview" or

"Windows Technical Preview for Enterprise",



then you can create a virtual machine that has a "UEFI" with "Secure Boot" enabled and you can run the following operating systems inside the virtual machine:

"Windows 8 Pro" or

"Windows 8 Enterprise" or

"Windows 8.1 Pro" or

"Windows 8.1 Enterprise" or

"Windows Technical Preview" or

"Windows Technical Preview"<sup>17</sup>

**Real, host computer runs  
"Windows 8/8.1 Pro or Enterprise,  
Windows Technical Preview"  
regular or Enterprise"**

**"Hyper-V" Virtual Machine  
Program**

**"Generation 2" Virtual Machine  
Has a Virtual "UEFI" with A  
"Secure Boot" Feature That  
Supports Windows 8/8.1/10**

**RUNNING "LINUX" IN A  
"VIRTUAL MACHINE"  
WITH "SECURE BOOT"**

To run distros of Linux that support "Secure Boot" inside a virtual machine that has a virtual UEFI with Secure Boot, you have to either use the Hyper-V module that is bundled in a "Windows Technical Preview 64-bit, build 9879 " host computer or the Hyper-V module that is bundled in a "Windows Technical Preview for Enterprise, 64-bit, build 9879" host computer.

**Real, host computer runs  
"Windows Technical Preview" or  
"Windows Technical Preview for  
Enterprise" (64 bit, builds 9879)**

**"Hyper-V" Virtual Machine  
Program**

**"Generation 2" Virtual Machine  
Has a Virtual "UEFI" with A  
"Secure Boot" Feature That  
Supports Some Linux Distros**

(References:

<http://technet.microsoft.com/en-us/library/dn765471.aspx>

and

<http://windowsitpro.com/hyper-v/secure-boot-linux-virtual-machine-hyper-v>

Note: in the first reference, "Windows Technical Preview (of "Windows 10") is called "Windows 10 Technical Preview".)

# CREATING A VIRTUAL MACHINE IN HYPER-V

## STEP 1:

Download either the 64-bit version of "Windows Technical Preview" or the 64-bit version of "Windows Technical Preview for Enterprise".

(See

[http://aztcs.org/meeting\\_notes/winhard  
sig/win10/win10TP-download.pdf](http://aztcs.org/meeting_notes/winhard<br/>sig/win10/win10TP-download.pdf)

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 1 (continued):

or

[http://aztcs.org/meeting\\_notes/winhard  
sig/win10/win10TPforEnt-  
download.pdf](http://aztcs.org/meeting_notes/winhard<br/>sig/win10/win10TPforEnt-<br/>download.pdf)

for details.)



# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 1 (continued):

Install "Windows Technical Preview 64-bit" or "Windows Technical Preview for Enterprise 64-bit" into a real, physical computer.

(See

[http://aztcs.org/meeting\\_notes/winhardsig/w  
in10/win10techprev-using.pdf](http://aztcs.org/meeting_notes/winhardsig/win10/win10techprev-using.pdf)

for details.)

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 2:

Install "Windows Technical Preview 64-bit" or "Windows Technical Preview for Enterprise 64-bit" into a real, physical computer.

(See

[http://aztcs.org/meeting\\_notes/winhardsig/win10/win10techprev-using.pdf](http://aztcs.org/meeting_notes/winhardsig/win10/win10techprev-using.pdf)

for details.)

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 3:

Get into the "Control Panel" of "Windows..".

STEP 4:

Start "Programs and Features".

STEP 5:

Click on "Turn Windows Features On or Off".

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 6:

Expand the "Hyper-V" item.

## STEP 7:

Activate the entire bundled "Hyper-V" program by placing checkmarks in the check boxes for the main menu listing and the submenu listings of "Hyper-V".

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 8:

Click on the "Start" button of "Windows  
Technical Preview.." or "

"Windows Technical preview for Enterprise".

## STEP 9:

Click on "All Programs".

# **CREATING A VIRTUAL MACHINE IN HYPER-V (continued)**

**STEP 10:**

Click on the "Hyper-V" menu folder.

**STEP 11:**

Start the "Hyper-V" Management Console.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 12:

Create a "Network Switch".

A good name for this external "Network Switch" is

"External Virtual Network Switch 1".

(See

[http://aztcs.org/meeting\\_notes/winhardsig/virtualmachines/Hyper-V/Hyper-V.pdf](http://aztcs.org/meeting_notes/winhardsig/virtualmachines/Hyper-V/Hyper-V.pdf)

for details.)

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 13:

From inside the "Hyper-V" console window, right click on the name of the host and select "New".

## STEP 14:

Select "Virtual Machine".



# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 15:

Select "I will install an operating system later".

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 16:

Select "Generation 2".

(See

<http://www.serverwatch.com/server-tutorials/how-to-create-generation-2-virtual-machines.html>

for some screenshots.)

# **CREATING A VIRTUAL MACHINE IN HYPER-V (continued)**

## **STEP 17:**

Set the amount of RAM for the new virtual machine.

## **STEP 18:**

Create a new virtual hard drive for the new virtual machine.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 19:

If you have not already done so, use a Web browser to download the installation .ISO file for the version of "Windows.." or the distro of "Linux that you will be installing inside the new virtual machine.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 20:

From inside the "Hyper-V Management Console", right click on the virtual machine

## STEP 21:

Select "Settings" from the pop-up context menu.

# **CREATING A VIRTUAL MACHINE IN HYPER-V (continued)**

**STEP 22:**

Click once on "SCSI Controller".

**STEP 23:**

Click on the "Add" button.

**STEP 24:**

Click on "DVD Drive".

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 25:

Attach the installation ISO file to the new virtual "DVD Drive" for the operating system that you wish to install inside the virtual machine.

## STEP 26:

From inside the "Hyper-V Management Console", right click on the virtual machine.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

**STEP 27:**

Select "Settings" from the pop-up context menu.

**STEP 28:**

Click on "Firmware,



# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 29:

Make sure that "Secure Boot" has a checkmark.

## STEP 30:

If you are installing "Windows.." into the virtual machine, go immediately to Step 43  
If you are installing a distro of "Linux", go to Step 31.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 31:

If you are installing a distro of Linux into the new virtual machine, prior to running the virtual machine for the first time to install Linux, you have to install Microsoft's security certificates for Linux into the "Secure Boot" portion of the UEFI as follows:

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 32:

Right click on the Start button of "Windows Technical Preview".

## STEP 33:

Click on "Command Prompt (Admin)".

# **CREATING A VIRTUAL MACHINE IN HYPER-V (continued)**

## **STEP 34:**

A command prompt window will be displayed.

## **STEP 35:**

Click once inside the command prompt window.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 36:

Make sure that the mouse is hovering inside the command prompt window.

## STEP 37:

At the MS-DOS-like command prompt inside the command prompt window, type in powershell

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

**STEP 38:**

Press the Enter key once.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 39:

At the MS-DOS-like command prompt inside the command prompt window, type in

```
Set-VMFirmware "vmname" -  
SecureBootTemplate  
MicrosoftUEFICertificateAuthority
```

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 40:

Use cut and paste to replace vmname with the name of the virtual machine that is shown in the "Settings" screen of the virtual machine.

(The "Windows Technical Preview" and the "Windows Technical Preview for Enterprise" are the first versions of "Windows.." that allow cutting and pasting into a command prompt window.)



# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 40 (continued):

The name of the virtual machine must be placed inside quotation marks if there are any spaces in the name of the virtual machine.

The quotation marks are optional and can be omitted if there are no spaces in the name of the virtual machine.

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 41:

Press the Enter key once.

No news is good news.

If you get a red error message, go back to "Step 40".

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

STEP 42:

Close the "Command Prompt (Admin)" windows by clicking on the "X" button in its upper-right corner.

(See

[http://technet.microsoft.com/en-us/library/dn765471.aspx#BKMK\\_linux](http://technet.microsoft.com/en-us/library/dn765471.aspx#BKMK_linux)  
for some screenshots.)

# CREATING A VIRTUAL MACHINE IN HYPER-V (continued)

## STEP 43:

Start the Hyper-V virtual machine and install the operating system into the virtual machine.

TESTING WHETHER A "WINDOWS.." COMPUTER  
OR A "WINDOWS.." VIRTUAL  
MACHINE IS RUNNING IN UEFI  
MODE:

After you complete the installation of the operating system into the virtual machine, reboot the virtual machine. Then start the virtual machine and test the virtual machine to make sure it is running in UEFI mode (instead of BIOS mode).

See

<http://www.eightforums.com/tutorials/29504-bios-mode-see-if-windows-boot-uefi-legacy-mode.html>

TESTING WHETHER A "WINDOWS.." COMPUTER  
OR A "WINDOWS.." VIRTUAL MACHINE THAT IS RUNNING IN UEFI  
MODE  
HAS "SECURE BOOT" ENABLED:

If you verify the virtual machine is running in UEFI mode, you should then test the virtual machine to make sure that it is running in Secure Boot mode:

Right click on the Start button of "Windows Technical Preview".

Click on "Command Prompt (Admin)".

A command prompt window will be displayed.

Click once inside the command prompt window.



Type in  
powershell.

Press the Enter key once.

Type in

Type in

confirm-securebootuefi

Press the Enter key once.

If

true

is displayed, then the Secure Boot part of  
the UEFI is enabled.

See

<http://technet.microsoft.com/en-us/library/jj603041.aspx>

and

<http://www.eightforums.com/tutorials/20208-secure-boot-confirm-enabled-disabled-windows-8-a.html>

and

<http://technet.microsoft.com/en-us/library/jj603042.aspx>

TESTING WHETHER A "LINUX"  
COMPUTER  
OR A "LINUX" VIRTUAL MACHINE IS  
RUNNING IN UEFI MODE WITH  
SECURE BOOT ENABLED:

See

<https://help.ubuntu.com/community/UEFI>

and

<http://www.howtogeek.com/175641/how-to-boot-and-install-linux-on-a-uefi-pc-with-secure-boot/>

and

<http://www.linuxjournal.com/content/growing-role-uefi-secure-boot-linux-distributions>

and

<https://en.opensuse.org/openSUSE:UEFI>

and

[http://docs.fedoraproject.org/en-US/Fedora/18/html-single/UEFI\\_Secure\\_Boot\\_Guide/](http://docs.fedoraproject.org/en-US/Fedora/18/html-single/UEFI_Secure_Boot_Guide/)

# REFERENCES

- <http://www.serverwatch.com/server-tutorials/enabling-uefi-on-virtual-machines.html>
- <https://codechief.wordpress.com/2013/02/14/how-to-setup-windows-8-in-uefi-bios-in-uefi-mode/>

# REFERENCES (continued)

- <http://www.pcworld.com/article/2028388/two-ubuntu-linux-versions-can-now-work-with-secure-boot.html>
- <http://windowsitpro.com/hyper-v/secure-boot-linux-virtual-machine-hyper-v>